JURNAL KESEHATAN
JURNAL ILMU-ILMU KEPERAWATAN, KEBIDANAN, FARMASI & ANALIS KESEHATAN
DOI : https://doi.org/10.52221/jurkes
JURKES
ISSN : 2089-3906

Effectiveness of Using Telemedicine Technology to Improve Elderly Health

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Article Information

Revised: April, 2024
Available online: April, 2024

Keywords

Telemedicine, Health Improvement, Elderly

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ABSTRACT

Elderly or old age is the end of a person's life span which is characterized by physical and psychological changes. Health problems in the elderly are various health conditions that commonly occur in older people. As a person gets older, they will experience comorbidities, such as metabolic disease, hypertension and diabetes mellitus, or as a complication of another disease they suffer from. In the context of elderly health, telemedicine is very important because it allows wider access to health services, especially for elderly people who live in remote areas or have other geographical obstacles. Several studies say that telemedicine is effective in improving the health of the elderly. The aim of this scoping review is to determine the effectiveness of telemedicine technology on the health quality of the elderly and to understand the mechanism of telemedicine technology in improving the health quality of the elderly. Method: Scoping review with literature search using PubMed, SCOPUS, SAGE Journals, Cambridge Core and E-Journal Springer/Springer Link databases with publication years 2020-2024. The findings showed that 10 selected published articles met the criteria and the results showed that telemedicine was effective in improving the health of the elderly.

INTRODUCTION

Elderly is the end of a person's life span characterized by physical and psychological changes. This period is identified as a critical time to evaluate one's success and failure in facing the present and future. The elderly are often faced with feelings of helplessness and depression, especially if the individual is less aware of his life journey and less obedient to his religious teachings (Akbar et al., 2021).

Health problems in the elderly are various health conditions that are common in older people. With increasing age, a person will experience comorbidities, such as metabolic diseases, hypertension and diabetes mellitus, or as complications from other diseases suffered. The elderly are also prone to osteoporosis, so it is important for them to regularly consume calcium milk. As age increases, a person's cognitive or thinking ability often also decreases, and many elderly people even experience dementia. Heart disease is one of the most common health problems found in the elderly. It is associated with hypertension and can lead to other diseases such as stroke. As age increases, a person's cognitive or thinking ability often also decreases, and not a few elderly people experience dementia (Kiik et al., 2018).

Losing a spouse, having fewer friends and children who no longer live at home can be factors that affect the psyches of the elderly. In addition, some elderly people also experience post power syndrome or a condition where a person loses a certain position or position that makes him feel unappreciated or respected which sometimes triggers his psychological problems. Depression is a mental disorder that can be experienced by the elderly. It can be caused by loneliness, lack of activity, chronic illness, or for no apparent reason. Thus, health problems in the elderly can be a variety of physical and mental disorders that are common as we age. Prevention and early treatment are very important to maintain the health of the elderly (Sari & Wirman, 2021).

Improving the health of the elderly is very important because the elderly have several characteristics that affect their health. The elderly experience a decline in physical functions, such as decreased endurance, decreased sensory abilities, and decreased motor abilities. The elderly are prone to chronic diseases such as hypertension, diabetes, heart disease and chronic obstructive pulmonary disease. Improving the health of the elderly can help reduce their risk of these diseases through regular check-ups and early treatment. Improving the health of the elderly can improve their quality of life. Improving the health of older adults can improve their overall health status. Improved health of the elderly can improve their spiritual quality of life. The elderly can have better self-confidence, have a better relationship with God, and have a clearer purpose in life (Ullhaque et al., 2022).

Telemedicine is a technology that uses information and communication technology to deliver healthcare virtually. With this approach, patients can receive medical consultation, diagnosis, and treatment without having to meet face-to-face with a healthcare professional. Telemedicine enables greater accessibility to healthcare, especially in situations where direct access to medical facilities may be difficult or limited. Telemedicine is a technology that uses information and

communication technology to deliver health services virtually. In the context of elderly health, telemedicine is very important because it allows greater accessibility to health services, especially for elderly people who live in remote areas or have other geographical constraints (Wulandhani et al., 2024). Thus, telemedicine is very important in improving the health of the elderly by improving access, efficiency, quality of service, education, consultation opportunities, quality of life, exercise, dhikr, self-monitoring, and sensor-based health monitoring.

Based on this background, the problem formulation in this study is how the effectiveness of telemedicine technology on the quality of elderly health? and how is the mechanism of telemedicine technology in improving the quality of elderly health? The purpose of this literature review research is to determine the effectiveness of telemedicine technology on the quality of elderly health based on current research.

METHOD

This literature review was prepared using a scoping review approach. The stages of making with the scoping review method are based on Arksey & O'Malley (2005) (Arksey, 2007), namely: First, researchers identify research questions, then identify relevant studies, then select studies, and map data and compile, summarize, and report results.

The search conducted on 5 databases resulted in a total of 98,339 articles which were then selected based on the inclusion and exclusion criteria to get a total of 10 articles analyzed with details on the PRISMA Flow Diagram for Scoping Review (PRISMAScR) (Figure 2.1).

Mapping the Data

The articles found were then extracted by collecting various information which was then entered into the analysis table. Information collected regarding article titles, authors and years of publication, research objectives, samples, research design, research results, the effectiveness of telemedicine technology on the quality of elderly health, and the mechanism of telemedicine technology in improving the quality of elderly health.

Compiling, Summarizing, and Reporting Results

The data analyzed in the article is then presented in the form of narrative reports and tables.

RESULTS AND DISCUSSION

A total of 75,3393 articles were found from 5 databases, and after duplication, screening, and selection based on inclusion and exclusion criteria, 10 articles were considered eligible for literature review.

Study Characteristics

All articles reviewed in this scoping review were published in 2020 (n=1), 2021 (n=0), 2022 (n=3), 2023 (n=2) and 2024 (n=4). A total of 8997 respondents from 10 articles were in the age range (>60 years). Of the 10 articles obtained, 2 articles were retrospective chart reviews, and the other articles were cross-sectional multimethod study, longitudinal cohort study, comprehensive analysis strategy, quantitative research and logistic regression, mixed methods exploratory sequential design, integrative systematic review, and multicenter randomized controlled trial (Table 3.1).

Study Characteristics

Author, Year Number of Samples Study Design (Sano E., et al. 2022) 140 retrospective chart reviews (Bhatia R., et al. 2022) cross-sectional multimethod studies (Pungchompoo, et al. 2024) 54 mixed methods exploratory sequential designs (Ohta, et al. 2024) 34 longitudinal cohort studies (Gayot C, (Gayot C., et al. 2022) 428 comprehensive analysis strategies (Győrffy Z. , et al. 2023) 1,723 quantitative and logistic regression studies (Ali AS., et al. 2023) 135 (Bertolazzi A., et al. 2024) 6,213 integrative systematic reviews (Abel B., et al. 2024) 270 multicenter randomized controlled trials (Costanzo M., et al. 2020) retrospective chart reviews (Costanzo M., et al. 2020)

1. Effectiveness of Telemedicine Technology on Elderly Health Quality

Based on the results of a review of 10 articles of findings, it is proven that telemedicine technology has effectiveness on the quality of elderly health. The results of research conducted by Pungchompoo, et al. (2024) which showed that improved health-related quality of life in physical and mental scores as a result of receiving the telehealth model. Six months after the experimental intervention, there were no statistical differences between the two groups, but evidence revealed positive changes in average scores for quality of life and some laboratory results compared to participants receiving usual care (Pungchompoo, et al. 2024). In line with the results of the study conducted by Győrffy Z., et al. (2023) that by monitoring and tracking health and disease conditions, accessing relevant health information, and various telemedicine solutions that can provide a safe and convenient way to connect with nurses. This can facilitate health promotion and disease prevention, greater autonomy and independence for older adults (Győrffy Z., et al. 2023).

Technology is rapidly changing the way older people and people with ADRD perform a number of iADLs. This pilot study suggests the widespread application of iADL technology to the lives of people with ADRD and highlights how measurement of these skills can help identify trends in iADL habits that can help reduce the impact of ADRD on daily functioning. Furthermore, these data point to the need to refine and improve existing iADL measures to validly capture the evolving technological landscape of those living with ADRD (Ali AS., et al. 2023). In line with research conducted by Costanzo M., et al. (2020) that the increasing use of telemedicine can actively improve the conditions of AD and MCI patients and their caregivers, and can offer good instruments for making early diagnosis and screening even if patients live in remote places (Costanzo M., et al. 2020).

Research conducted by Ohta, et al. (2024) found a Mobile Health application that suggests that tools promoting self-management among independent community-dwelling older adults with frailty may serve as an acceptable foundation for developing preventive strategies for continuing care (Ohta, et al. 2024). Research conducted by Gayot C., et al. (2022) with GERONTACCESS results revealed that our preventive and gerontological TLM program significantly reduced unplanned

hospitalizations. This innovative intervention limits disease progression and promotes a healthy lifestyle among nursing home residents (Gayot C., et al. 2022). This is in line with the results of a study by Abel B., et al. (2024) that the proposed GeRas program may represent an effective intervention to improve the physical capacity and participation of geriatric patients after discharge to their hospital. This program may improve the success of inpatient rehabilitation treatment and maintain patient autonomy (Abel B., et al. 2024).

The results of a study conducted by Bhatia R., et al. (2022) showed that in total, 39.5% of participants felt telemedicine was worse than in-person visits (only 4.9% felt telemedicine was better than in-person visits) and 22.2% reported that they were less likely to ask about various health issues during telemedicine visits (4.8% said it was more likely); 45.9% gave the highest collaboration score to their telemedicine visits (Bhatia R., et al. 2022). This is in line with the results of a study conducted by Bertolazzi A., et al. (2024) that the review highlighted several aspects of older adults' health status, one of the individual-level factors that can negatively impact access to healthcare technology. By considering the enabling factors outlined in the review, it is possible to identify some strategies to mitigate barriers. Therefore, healthcare providers should consider introducing digital health tools to older adults through customized and easy-to-understand training (Bertolazzi A., et al. 2024).

These findings suggest the need for telehealth programs to involve families in training and use of telemedicine options. Healthcare providers who deliver emergency or urgent care via telehealth need to be trained regarding triage, Emergency Medical Services capacity, and transportation times when pandemics and other disasters occur (Sano E., et al. 2022).

2. Mechanisms of Telemedicine Technology in Improving the Quality of Elderly Health

In the 10 articles reviewed, several mechanisms for using telemedicine technology in improving the quality of elderly health were mentioned. The results of research conducted by Győrffy Z., et al. (2023) that the internet provides a means of communication and a greater degree of social connectivity for the elderly, thereby reducing isolation and improving well-being, meaning greater autonomy and social connectedness (Győrffy Z., et al. 2023). The literature suggests that, in order to be accepted and used over time, devices must be non-invasive and perceived as comfortable by users. They also have functions to measure and quantify body functions and health status, set measurable goals for physical activity, send reminders to users, allow users to track long-term improvements and share data with doctors. In addition, developers should consider the possibility of involving end users in the design and development process of digital health devices (Bertolazzi A., et al. 2024). This is in line with the results of research conducted by Pungchompoo, et al. (2024) mentioned that the effectiveness of telehealth lies in its potential to improve symptom management and

quality of life of patients with long-term chronic conditions, as well as potentially reducing healthcare costs; these benefits have been demonstrated in a number of recent studies (Pungchompoo, et al. 2024).

Research conducted by Sano E., et al. (2022) mentioned that the Virtual Emergency Care program, launched in 2018, is a TM platform where patients outside the hospital setting (e.g., at home, at work) can virtually connect and access a board-certified emergency physician for consultation and a virtual examination/treatment plan, using a secure link on the hospital's webpage. Users of the program are a mix of patients already in our healthcare system who receive targeted hospital messages about TM services, along with community members who discover the program through web searches (Sano E., et al. 2022). In line with the results of research conducted by Ohta, et al. (2024) found a Mobile Health application which showed that participants were instructed to wear the device on the left lumbar region for one week (excluding time spent showering, swimming, or sleeping), with a requirement of at least six hours of wear per day. Inclusion in the analysis required a minimum of three days of wear. Measurements of step count, physical activity, and sedentary behavior were made at baseline, at the end of week 13, and immediately after the application course (end of week 6) (Ohta, et al. 2024).

Research conducted by Abel B., et al. (2024) mentioned mRNLI is an instrument that combines social, psychological, and physical aspects and assesses patients' perceptions regarding their ability to resume daily activities after a disabling illness or injury. This 11-item questionnaire consists of two subscales. Information on routine activities, including questions on mobility, self-care ability, daily activities, leisure activities, social activities, and family roles, is summarized in the "Daily Functioning" subscale. Interpersonal and intra-personal behaviors, represented by questions about personal relationships, self-presentation, and general coping skills are summarized in the "Personal Integration" subscale (Abel B., et al. 2024).

CONCLUSIONS AND RECOMMENDATIONS

After reviewing several articles, telemedicine technology has been shown to be effective in improving the quality of health of the elderly. Several studies have shown that telemedicine can improve the quality of life of the elderly in physical and mental scores, as well as provide better access to relevant health information. However, there are some findings that show that some prefer in-person visits over telemedicine, and some aspects such as training and family support need to be improved to increase the effectiveness of telemedicine in the elderly population. In addition, overcoming barriers to access and use of health technology also needs to be considered. Overall, telemedicine technology offers various benefits in improving the quality of life of older adults through several key mechanisms, such as increased social connectivity to reduce isolation, and improve their well-being and

autonomy, better management of health conditions, and support in daily activities.

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